ASTM INTERNATIONAL

Designation: D3775 – 12

Standard Test Method for
Warp (End) and Filling (Pick) Count of Woven Fabrics[1]

This standard is issued under the fixed designation D3775; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This test method covers the measurement of warp end count and filling pick count and is applicable to all types of woven fabrics.

NOTE 1—Historically, the term fabric count has been used to describe the end and pick count of woven fabrics. The terms warp (end) and filling (pick) count are replacing the term fabric count, to provide clarity.

1.2 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]
D123 Terminology Relating to Textiles
D1776 Practice for Conditioning and Testing Textiles
D4850 Terminology Relating to Fabrics and Fabric Test Methods
D7023 Terminology Relating to Home Furnishings
2.2 *Other Standard:*
ANSI/ASQC Z1.4—Inspection by Attributes[3]

3. Terminology

3.1 For all terminology related to D13.59, Fabric Test Methods, General, refer to Terminology D4850

3.1.1 The following terms are relevant to this standard: count, end, end count, filling, pick, pick count, thread count. thread count

3.2 For all terminology related to Home Furnishings, refer to Terminology D7023.

3.3 For all other terms related to textiles, refer to Terminology D123.

4. Summary of Test Method

4.1 The number of warp yarns (ends) per unit distance and filling yarns (picks) per unit distance are determined using suitable magnifying and counting devices or by raveling yarns from fabrics. See ANSI Z1.4.

5. Significance and Use

5.1 This test method is considered satisfactory for acceptance testing of commercial shipments because it has been used extensively in the trade for that purpose.

5.1.1 If there are differences of practical significance between reported test results for two laboratories (or more), comparative test should be performed to determine if there is a statistical bias between them, using competent statistical assistance. As a minimum, use the samples for such a comparative test that are as homogeneous as possible, drawn from the same lot of material as the samples that resulted in disparate results during initial testing and randomly assigned in equal numbers to each laboratory. The test results from the laboratories involved should be compared using a statistical test for unpaired data, a probability level chosen prior to the testing series. If bias is found, either its cause must be found and corrected, or future test results for that material must be adjusted in consideration of the known bias.

5.1.2 This test method is suitable for use with narrow fabrics when the count across the total width is measured in the narrow direction and extrapolated to the number of yarns per centimetre or inch.

6. Apparatus

6.1 Use any suitable device, such as pick glass, rule and pointer, microfilm reader, or projection equipment. The use of optical sensing equipment may be used as agreed upon by the purchaser and supplier.

6.2 Use a scale graduated in mm (1/16 in.) to measure the width of the fabric test specimen to be raveled for a count of yarns.

7. Sampling

7.1 *Lot Sample*—As a lot sample for acceptance testing, take at random the number of rolls of fabric as directed in an applicable material specification or other agreement between the purchaser and the supplier. Consider rolls of fabric to be the primary sampling units.

7.2 *Laboratory Sample*— As a laboratory sample, take a full width swatch at least 2 m (2 yd) long from each roll of fabric in the lot sample. Consider each designated place at which warp end counts and filling pick counts are made as a test specimen.

NOTE 2—For specimens not obtained as directed in Section 7, the results should not be used for acceptance testing of a lot.

8. Conditioning

8.1 Condition specimens as directed in Practice D1776.

8.2 Fabrics woven from yarns having a relatively low moisture regain in the standard atmosphere for testing textiles, which is 21° ± 1 C (70° ± 2 F) and 65 % relative humidity, and which are not significantly affected by minor variations in different atmospheric conditions, for example, nylons, acrylics, and polyesters, may be tested without preconditioning. Fabrics woven from yarns composed wholly or in part from wool, rayon, cotton, or acetate are more sensitive to atmospheric changes and must be conditioned prior to testing, except by agreement of all parties interested in the test results.

8.3 When full rolls or bolts of fabric cannot be properly conditioned in a reasonable time with available facilities, perform the test without conditioning and report the actual conditions prevailing at the time of the test. Such results may not correspond with the results obtained after testing in the standard atmosphere for testing textiles.

9. Procedure

9.1 *General:*

9.1.1 Count the number of warp yarns (ends) and filling yarns (picks) in five randomly spaced places diagonally across the width of the laboratory sampling unit. Count individual warp ends and filling picks as single units, regardless of whether they are comprised of single or plied components.

9.1.2 When two yarns are laid-in together and parallel, count each yarn separately, as a single unit, regardless of whether it is comprised of single or plied components.

9.1.3 In fancy weaves, where one or more yarns do not appear at regular, short intervals, make count measurements over at least one full pattern repeat of each design in the weave.

9.1.4 When the coefficient of variation for five counts is higher than 5 %, make five additional counts and average the results of the ten readings.

9.2 *Specific Fabric Widths:*

9.2.1 For fabric widths of 1000 mm (40 in.) or more, make no count closer than 150 mm (6 in.) from the selvage edge, or within 0.5 m (0.5 yd) from the end of the roll or piece.

9.2.2 For fabric widths of less than 1000 mm (40 in.) but greater than 125 mm (5 in.), make no count closer than one tenth of the width of the fabric, or within 0.5 m (0.5 yd) from the end of the roll or piece.

9.2.3 For narrow fabrics constructed with widths of 25 mm (1 in.) or less, count all of the yarns in the width of the fabric. When the data are reported, the fabric width, the number of yarns within that width, and the resultant calculated yarns per centimetre (inch) shall be reported.

9.3 *Specific Fabric Counts*

9.3.1 For fabrics containing less than 1 yarn per mm (25 yarns per in.), count the number of warp yarns (ends) over a 75 mm (3 in.) width, in five randomly selected places across the width of the laboratory sampling unit, and count the number of filling yarns (picks) over a 75 mm (3 in.) length in five randomly selected places along the length of the laboratory sampling unit.

9.3.1.1 When the coefficient of variation for five counts in a 75 mm (3 in.) width is higher than 5%, discard those readings and make five fresh counts over a 125 mm (5 in.) width.

9.3.1.2 For fabrics containing 1 yarn per mm (25 yarns per in.) or higher, count the number of warp yarn (ends) over 25 mm (1 in.) of width in five different, randomly selected places across the width of the laboratory sampling unit, and count the number of filling yarns (picks) over a 25 mm (1 in.) length in five different, randomly selected places along the length of the laboratory sampling unit.

9.4 *Count by Raveling Options*— When individual yarns cannot be readily distinguished for counting in a fabric, one of the two alternative options shown below may be used.

9.4.1 Ravel a piece of fabric parallel to the direction to be counted, obtain a straight edge, then ravel and count the yarns in a 25 mm (1 in.) strip. For example, cut a strip of fabric from each randomly selected place, approximately 35 mm (1.5 in.) wide, and of practical length parallel to the yarns to be counted. Then ravel each strip to give a testing width of 25 mm (1 in.) by removing an approximately equal number of yarns from each side, prior to counting.

9.4.2 Make a straight cut through the fabric across the yarns to be counted. Place a ruler along the cut edge and mark off a 25 mm (1 in.) length. Count the number of yarns protruding between the two marks. If possible, ravel a yarn or two, to ensure that only protruding yarns are being counted.

10. Calculation

10.1 Calculate the average of all warp end counts made for the warp direction to the nearest individual yarn for each roll and for the lot.

10.2 Calculate the average of all filling pick counts made for the filling direction to the nearest individual yarn for each roll and for the lot.

10.3 When requested, calculate the thread count of the fabric as the sum of the warp end and filling pick counts to the nearest whole number for each roll and for the lot.

10.4 For narrow fabrics, extrapolate the count in the narrow direction to 1 cm (in.) using the following equations:

$$\text{Count/W, cm} = \text{yarns/cm} \qquad (1)$$

$$\text{Count /W, in.} = \text{yarns/in.} \qquad (2)$$